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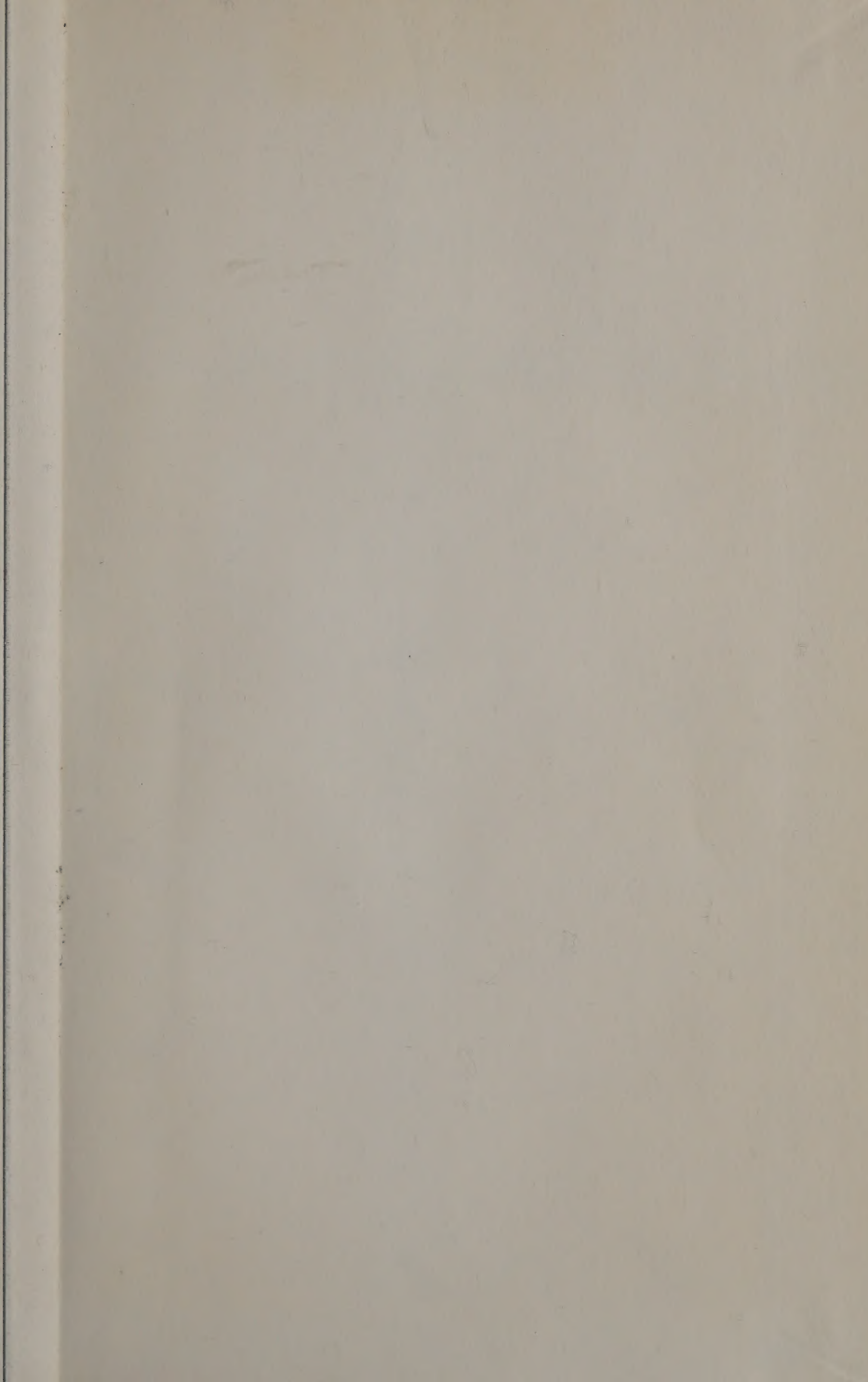
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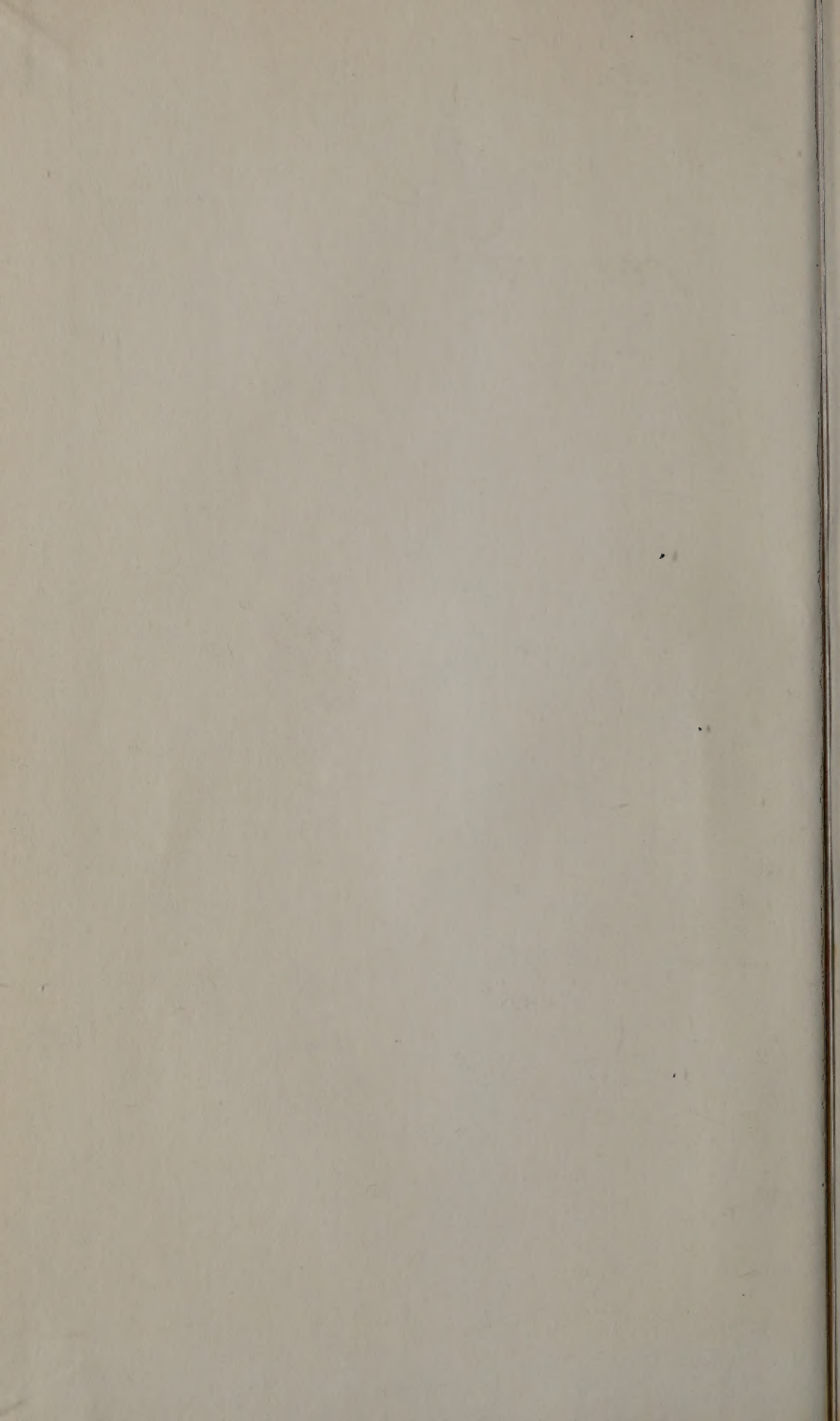


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REPORT

OF THE SURVEY OF THE

INDIANA CENTRAL RAILWAY

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BY THE

CHIEF ENGINEER.

JULY 14, 1851.

INDIANAPOLIS:

PRINTED BY AUSTIN H. BROWN.

1851.



REPORT

OF THE BOARD OF THE

INDIANA CENTRAL RAILROAD

AT THE

CHIEF ENGINEER

JULY 1st 1891

INDIANAPOLIS

PRINTED BY AGOSTIN B. BROWN

1891



# OFFICERS OF THE COMPANY.

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## DIRECTORS,

A. C. BLANCHARD,  
JAS. R. MENDENHALL, } *Richmond.*

JOHN S. NEWMAN,  
NORRIS JONES, } *Centreville.*  
DAVID COMMONS,

THOMAS TYNER, } *Cambridge.*  
WILLIAM S. PETTY,

WILLIAM BUTLER, *Dublin.*

JOHN T. WHITE, *Raysville.*

JAMES P. FOLEY, *Charlottesville.*

NATHAN CRAWFORD, *Greenfield.*

WM. SULLIVAN, } *Indianapolis.*  
I. B. SANDUSKY,

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## PRESIDENT,

JOHN S. NEWMAN.

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## SECRETARY,

JOHN M. COMMONS.

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## TREASURER,

NORRIS JONES.

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## CHIEF ENGINEER,

HENRY C. MOORE.

OFFICERS OF THE COMPANY.

THEY ARE

A. C. BLANCHARD  
JAB. R. WENDENHALL

JOHN S. NEWMAN  
NORRIS JONES  
DAVID COMMONS

THOMAS TYNER  
WILLIAM A. TITTY

WILLIAM BUTLER

JOHN T. WHITE

JAMES F. POLLY

NATHAN CRAWFORD

WM. SULLIVAN  
I. B. RANDUSKY

RESIDENTS

JOHN S. NEWMAN

SECRETARY

JOHN M. COMMONS

TREASURER

NORRIS JONES

CHIEF ENGINEER

HENRY C. MOORE

1765118

## REPORT.

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MUEL HANNAH, ESQ., *President of the*  
*Indiana Central Railway Company:*

SIR:—According to instructions received from you, I have made location of your Railway from the eastern line of the State to Indianapolis, and now submit the following report and estimates of cost, together with a map and profile of the line.

The road having been divided by your Board for convenience in instruction into five divisions, I shall take them up in their order, and give you a detailed description of each.

### DIVISION No. 1.

*From the State line to Centreville.*

This Division begins on the line between Ohio and Indiana, on the north side of the east fork of White Water, at the point where the Dayton and Western Railroad, of which it is a continuation, terminates; and continues the direction of the last tangent of that road till it crosses the east fork to the south side of the valley, near Nasson's. Here a slight curve to the south is made, and then taking a direction which passes a short distance south of Hill's house and mills, the line continues till it intersects the Richmond and Miami Railroad, running from Richmond to the State line, in the direction of Eaton and Cincinnati, on the Hibbard farm. 2.10 miles from the State line. It then runs along the north side of that road to the Depot location in Richmond, a distance of 2.09 miles from the junction, and 4.19 miles from the State line. I propose to increase the width of grade of this part of that road to make it wide enough for two tracks, each Company to pay its proper proportion of the cost of grading, and put down its own track. This will save several thousand dollars to both Companies, and be just as well for the roads as though they were kept entirely separate.

From the termination of the Richmond and Miami road to the west side of the East Fork valley, a distance of 2,020 feet, the line is identical with that of the Newcastle and Richmond Railroad, now in course of construction, the same location answering both roads quite as well as any other that could be had.



The valley of the East Fork here presents one of the most formidable obstacles in the route of your road, being nearly 600 feet wide and 70 feet below the grade line.

This chasm I propose to cross by a substantial wooden bridge of stone piers, with the track on the top of the bridge. The bluffs on each side being rock, no artificial abutments of any magnitude will be necessary. By uniting with the Newcastle Company in the construction of this bridge, and the small portion of road between and the common Depot, a considerable saving will be made to each and both roads as well accommodated as though two bridges were erected. There can, I think, be no valid objection to this arrangement, and I presume that Company will very willingly make it. I have accordingly put in my estimate but half the cost of this bridge.

From the west end of the East Fork bridge, the line curves to the south and takes a due west direction along a county road for 2 miles, to the old Indian boundary line—a new road will have to be made on the south side of the railroad. Here it curves to the south 24 degrees, and then runs straight to the town of Centreville, a distance of 5.87 miles from the Richmond depot, and 10.06 miles from the State line.

Two of the shortest curves on the road occur on this division, at the ends of the bridge at Richmond, having a radius of 1,547 feet, both however are on a level grade, and just at the town, where they are less objectionable than any other location. The whole amount of curvature on this Division is 1.25 miles, and of strait line, 8.81 miles; and the highest grade, 48 feet per mile.

The estimated cost of grubbing, grading, and bridging, is \$51,896 19, viz:

From State line to intersection with road to Eaton, . . .	\$11,262 68
Half cost of Eaton road thence to Richmond, . . . . .	7,500 00
Half cost of East Fork bridge and road in do., . . . . .	10,000 00
From East Fork bridge to Centreville, . . . . .	18,415 68

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\$47,178 36

Add ten per cent. for contingencies and engineering, . . .

4,717 83

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\$51,896 19

If you fail to make the proposed arrangement with either or both of the Companies named, these estimates will be increased correspondingly.

## DIVISION No. 2.

### *From Centreville to Dublin.*

This is the most difficult and expensive Division on the road. On it are the different branches of the West Fork of White Water, Noland's, Green's and Martindale's Forks, and West River, all presenting valleys that have to be crossed nearly at right an-



to their direction, with high lands between. In going to the  
each of these streams is lower than the other. The ridge be-  
n Noland's and Green's Forks known as Jackson's Hill, is but  
ve feet lower than the highest point on the road—the summit  
of Flat Rock.

leaving Centreville, the line runs nearly west till it reaches the  
nit of the ridge west of Noland's Fork, on Judge Test's farm.  
en curves to the south, and crosses the National Road just west  
e village of Pin Hook, descending to the valley of Green's  
. The maximum grade on the road 58 feet per mile, occurs  
rossing this ridge, both ascending and descending. From  
n's Fork valley the line runs nearly parallel with the National  
l, to the east side of Cambridge City, where a change in direc-  
of  $1\frac{1}{2}$  degrees is made, to take the course of the streets—then  
ng through the second street south of the National Road,  
ing West river and the White Water canal; the same direc-  
being continued, it reaches the western part of the town of  
in, 11.50 miles from Centreville. The maximum grade occurs  
in ascending from Cambridge to Dublin.

length of curves is.....	0.52 miles.
length of tangents,.....	10.98 miles.
estimated cost of grubbing, grading and bridging,....	\$107,248 93
per cent added for contingencies,.....	10,724 89
Total,.....	<hr/> \$117,973 82

### DIVISION No. 3.

s Division extends from Dublin to Knightstown, and is 16.85  
long, most of the distance being over very favorable ground.  
angent which runs through Cambridge to Dublin is continued  
s Division, passing through the south part of Lewisville, until  
es a section line near Morris's tavern, some two miles east of  
n. This tangent is 14.40 miles long. At this point a very  
curve is made, and the line runs west along the section line,  
ng the National Road to the north side of Cox's, and running  
of the village of Ogden, till it falls into the valley of Buck  
down the south side of which it follows into Blue river val-  
Then passing through Raysville, it crosses the National Road  
south, crosses Blue River and reaches the Shelbyville and  
tstown Railroad, which it crosses about 20 feet south of their  
building.

length of curves is.....	1.04 miles.
length of tangents is.....	15.81 miles.
estimated cost of grubbing, grading, and bridging,....	\$51,870 20
per cent added for contingencies, &c.,.....	5,187 02
total cost,.....	<hr/> \$57,057 22

## DIVISION No. 4.

This Division extends from Knightstown to Greenfield, and 13.13 miles long. On the first two miles in getting out of the B river valley, there is some tolerably heavy grading; all the rest the Division is over very favorable ground for cheap construction. Leaving the Knightstown depot, the tangent which crosses B river is continued until it has crossed Montgomery's creek; at which a curve of 9282 feet radius is made for 3400 feet, when a west course is taken along the township line, on the old Indianapolis State road. This line is followed for  $9\frac{1}{2}$  miles, to within  $2\frac{1}{2}$  miles of Greenfield, near Reed's tavern, at which point the route is rods south of the National Road. Here a slight curve is made changing the direction  $2\frac{3}{4}$  degrees, and a tangent started which runs through the second street south of the Court House in Greenfield to the western part of that town, near the Seminary, where the division terminates.

The grading of this Division was let to contractors in November last; and since I have revised the location the contractors have been set to work. Most of the grading will probably be done in fall. The maximum grade is 48 feet per mile, and least radius of curvature 6,188 feet. Amount of curves is 0.70 miles.

This Division is divided into 18 sections, and the estimated cost of grubbing, grading, and bridging, is.....\$29,062  
Ten per cent. added for contingencies,..... 2,906

Total,.....\$31,968

## DIVISION No. 5.

*From Greenfield to Indianapolis.*

The country over which this division of road is located, is remarkably favorable for a straight and cheap road; indeed I do not think if amongst all the cheap roads in the west, a Division of equal length can be found which can be so cheaply built, and which is so straight and level. The length of this Division is 20.13 miles, and its cost for grubbing, grading, and bridging will be about \$1,700 per mile.

Nearly the whole of this part of the road is a continuation of the tangent, started  $2\frac{1}{2}$  miles east of Greenfield, running nearly parallel with the National Road, and some 40 or 50 rods south of it, just leaving room for one large field between the roads. The road passes the villages of Philadelphia and Cumberland on the south and crosses Sugar creek, Buck creek, and Pleasant run, which are the only streams of any consequence on the Division. Near the Deaf and Dumb Asylum, in the vicinity of Indianapolis, the tangent which is 21.17 miles long, ends, and a curve is made to turn the direction of the streets of the city; and passing the Asylum

buildings on the south, so far as not to interfere with their grounds, enters the city on the first street south of Washington street, which is the centre of the city, and after crossing Pogue's run, unites with the Union Track Railroad. By curving to the south near the Asylum, the road can enter the city on Louisiana street, the one on which the Union passenger depot is located, and through which the Terre Haute Railroad enters the city from the west. Either of these routes can be taken to advantage, the choice depending on where you can get the necessary lands for depot purposes on the best terms, and where the damages will be the least.

The length of curved line is..... 0.32 miles.

The length of straight line is..... 19.81 miles.

The estimated cost of grubbing, grading, and bridging, is .....	\$30,753 92
Ten per cent. added for contingencies, .....	3,075 39

Total, .....	\$33,829 31
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The whole estimated cost of the road will be as follows:

Division No. 1, 10.06 miles; grubbing, grading, and bridging, .....	\$51,896 19
Division No. 2, 11.50 miles; grubbing, grading, and bridging, .....	117,973 82
Division No. 3, 16.85 miles; grubbing, grading, and bridging, .....	57,057 22
Division No. 4, 13.13 miles; grubbing, grading, and bridging, .....	31,968 36
Division No. 5, 20.13 miles; grubbing, grading, and bridging, .....	33,829 31

71.67	\$292,724 90
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Seventy-six miles of superstructure, including $4\frac{1}{2}$ miles of side tracks, at \$6,500 per mile, .....	494,000 00
Ballasting with gravel at \$700 per mile, average, ....	50,169 00

Total cost of road without motive power and cars, .....	\$836,893 90
To which add for engines and cars for first year's business, .....	124,000 00
For depots, shops and water stations, .....	35,000 00
One-fourth cost of Union track and passenger depot at Indianapolis, .....	7,000 00

Total, .....	\$1,002,893 90
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Average cost per mile for construction alone, .....	\$11,677 04
Average cost per mile equipped for business, .....	13,993 22

The following tables show the grades and curvature:



## TABLE OF GRADES.

Level grade,.....	18.45 miles.
Level to 10 feet per mile,.....	3.42 miles.
10 feet to 20 feet,.....	7.67 miles.
20 feet to 30 feet,.....	9.73 miles.
30 feet to 40 feet,.....	13.40 miles.
40 feet to 48 feet,.....	13.55 miles.
48 feet to 58 feet,.....	5.45 miles.
	<hr/>
	71.67 miles.

## TABLE OF CURVES.

Curves of 1,547 feet radius,.....	5,799 feet.
Curves of 2,063 feet radius,.....	351 feet.
Curves of 3,094 feet radius,.....	7,317 feet.
Curves of 4,641 feet radius,.....	270 feet.
Curves of 5,730 feet radius,.....	1,600 feet.
Curves of 6,188 feet radius,.....	297 feet.
Curves of 9,282 feet radius,.....	4,581 feet.
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Total,.....	20,215 feet, 3.84 miles nearly.
Total amount of straight lines,.....	67.84 miles.
	<hr/>
Total length,.....	71.67 miles.

The whole length of the road, from the State line to the point in Indianapolis where it connects with the Union track, is 71.67 miles, and this point is some third of a mile from the place where the general passenger depot for the joint use of all the Railroads entering the city, is to be built.

The aggregate length of the curves is 3.83 miles, and of straight lines, 67.84 miles, the curvature being but  $5\frac{1}{3}$  per cent. of the whole. I know of no Railroad, east or west, which can show so small an amount of curvature. In this particular it is believed to be unrivalled. A perfect Railroad would be straight and level. It will be seen from the above that your road has *one* of the elements of perfection in an eminent degree. The minimum radius of curvature is 1,547 feet, of which there is something over a mile, and nearly all the rest is over 3,000 feet radius. As much as possible the curves have been placed on level grades, or those very nearly so.

From an examination of the table of grades, it will be seen that 18.45 miles, or something over one-fourth of your road will be level, and that nearly 40 miles of it is under 30 feet per mile. Of the residue there are 5.45 miles from 48 to 58 feet per mile. This may be considered a high grade for a Railroad in the west, but where it is considered that we have no grade over 40 feet per mile, that is



not on a *straight line*, it will not be so objectionable. The necessity for these grades might be obviated at an increased cost, by introducing more curvature; but on a road destined as yours is to become a great avenue for passenger travel, and consequently on which a high rate of speed will be very desirable, much curvature is more objectionable than any grade not exceeding 60 feet per mile, on a straight road. Having a due regard to economy in construction, and the ability of the Company, I have introduced these grades, believing that the best interests of the Company and road would be promoted thereby.

I have made the estimates with a view to having the road constructed in the most substantial and permanent manner, so as to make it a first class road in every respect, and there can be no doubt such is the true policy of the Company. In Railroad building, as in almost everything else, the old adage that "whatever is worth doing at all, is worth doing well," holds true; and in a road like yours, which is to be an important link in the great chain of Railroads extending from the Seaboard to the Mississippi, and ultimately to the Pacific, through Central Indiana, it is particularly important that it be well constructed, and every facility given to rapid locomotion. If well constructed, your road will be one on which, as a regular thing, as high a rate of speed can be made as on any road in the country.

I have calculated the road to be graded for a single track, with the necessary turnouts for passing places. The grade to be 15 feet wide at the sub-grade line in embankments, and 18 feet wide in cuts, with side slopes of  $1\frac{1}{2}$  to 1 in the former, and 1 to 1 in the latter. On this grade I propose to put a ballasting of gravel, one foot deep, and ten feet wide on top; and if possible to have it well settled before the superstructure is laid down. I regard this matter of graveling the road *before* laying the track, of great importance, not only to its solidity and firmness, but also to its durability; for it is a well ascertained fact that timber, imbedded in gravel, will last very much longer without decay, than when laid in clay or common earth.

The superstructure I have estimated to be built with the T rail, weighing 60 lbs. per lineal yard, laid on White or Burr Oak cross ties, 6 by 8 inches, and 8 feet long, the ties to be imbedded in the ballasting nearly level with their upper surfaces, and well settled and rammed along their sides. Your road, built in this manner, when once settled, will remain firm and solid—will be but little effected by the frosts, and will require scarcely any repairs for years.

I might go on to show the importance of your road, and the probable productiveness of its stock, but I scarcely deem it necessary. Any one who entertains doubts on this subject, can easily have them dissipated, if he will examine a map of the country and see the chain of roads both east and west of this one, with which it will be connected, which are now finished or rapidly approaching completion, a large share of whose business must inevitably pass

over this road. The Terre Haute and Indianapolis Railroad, the western continuation of this road, is now all graded; twelve miles of the track is now laid, and the residue is going on at the rate of three to four miles a week. There is now no doubt of its completion at farthest by the first of January next. The Lafayette and Indianapolis Railroad is progressing finely; their iron has been purchased, and they confidently expect to have the whole road ready for the cars in the summer of 1852. The road from Terre Haute to Alton and St. Louis, across the State of Illinois, is in progress, and will probably be completed as soon as your road can be built, as also an extension northwardly, from Lafayette toward Lake Michigan and Chicago. All these western roads, with others not named, centering at the Railroad City of Indianapolis, will bring an amount of trade and travel to that place, which will surprise the most sanguine; a large portion of which, seeking an eastern outlet, will pass over your road, because it is the shortest, most direct, and passes through the most inviting parts of Indiana and Ohio, to travel through to the East. I have positive assurances from the Engineer of the Dayton and Western Railroad, that that road will be completed and the cars running from Dayton to the State line at the eastern end of your road in April next. Your road will then only be wanted to make a continuous railroad from Terre Haute by Indianapolis, Dayton and Springfield, to Sandusky. From Dayton to Xenia, a distance of 18 miles, a road is about to be built, connecting with, or rather an extension of the Xenia and Columbus road now in use. A railroad is also projected and has recently been located from Springfield to connect with the Xenia and Columbus road at or near London, making a very direct route to Columbus from Dayton. From Springfield a road is also to be built to the Columbus and Cleveland Railroad, at or near Delaware; and to this point the Ohio and Pennsylvania Railroad is to be extended from Loudenville. From Columbus a road is now in progress through Newark and Zanesville to Wheeling, where it will connect with the Baltimore and Ohio Railroad; and from Newark another road has been commenced, running through Coshocton to Steubenville, on the Ohio river, which will probably be continued across the great bend of the Ohio to Pittsburgh. By this latter road you have the shortest and most direct route from Indianapolis through Dayton and Columbus to Pittsburgh and Philadelphia. By the Columbus and Wheeling road, your line connects directly and naturally with the Baltimore and Ohio road. By Springfield, Delaware and Loudonville, your road is part of a direct line from Indianapolis to Pittsburgh, *shorter* than by any one *north* of it; and by your road and the Columbus and Cleveland road from Delaware, it is about as near Cleveland as by any other route from Indianapolis. From Cleveland by the railroad now constructing down the Lake shore to Dunkirk and Buffalo, you have a continuous line to New York by the New York and Erie road, and also to Albany and Boston, by the line through central New York.

But in addition to the through business that must pass over your road from all these connections with the east and west, you must have a very large local or way business, which is much the most profitable to a railroad.

The country through which your road passes, is the most densely populated part of the State of Indiana; and along a considerable part of the road, there is already nearly a continuous town, there being sixteen towns and villages on the road. Then there is the railroad from Shelbyville to Knightstown, now in use, which must, to a considerable extent, become a *feeder* to your road; and another is about to be commenced from Rushville to Cambridge, which will also contribute to its business.

The whole estimated cost of your road, equipped for business, is one million of dollars; and I have every confidence that it can be built for that sum. The estimates of quantities have been made with great care, and the prices are believed to be liberal cash prices. This will make it one of the cheapest roads in the west.

Other things being equal, that road which costs the least money will pay the largest dividends, is a position none will deny. Compare your road then with other western roads which are paying large dividends on their stock. The gross receipts of the Little Miami Railroad, from Cincinnati to Springfield, which cost \$25,874 per mile, in 1850 were \$405,000, about half of which was from passengers. Those of the Mad River and Lake Erie road, which cost about \$20,000 per mile, were \$442,926. Whilst on the Madison and Indianapolis Railroad, which cost largely more than your road will, the receipts last year amounted to \$300,000. It would seem to be a fair estimate to say that the receipts of your road would equal the receipts of either of those named. But say they would only equal the Madison and Indianapolis road, and deduct 50 per cent. for working expenses and repairs, and you have left \$150,000 net profits per annum, *which is fifteen per cent. on its cost.*

Annexed you have the estimates in detail, showing the different items of work and the prices on each section.

All of which is respectfully submitted.

H. C. MOORE,  
Chief Engineer.

ENGINEER'S OFFICE, CENTREVILLE, }  
July 14, 1851. }

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